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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,771	12/16/2003	Akihisa Hongo	2003_1822A	4044
513 7590 07/18/2007 WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021			EXAMINER MACARTHUR, SYLVIA	
			ART UNIT 1763	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/735,771	<b>Applicant(s)</b> HONGO ET AL.	
	<b>Examiner</b> Sylvia R. MacArthur	<b>Art Unit</b> 1763	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 34-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 34-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 20-33 of 11/9/2006 have been considered but are moot in view of the new ground(s) of rejection. These claims and their limitations have been cancelled while applicant introduced new claims 34-53.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) The invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 34, 35, 52, and 53 are rejected under 35 U.S.C. 102(a) or 102(e) as being anticipated by Emesh et al (US 2002/0148732).

Emesh et al teaches a method and apparatus of electrochemically depositing a material onto a workpiece surface. See Figs. 4,5, and 10.

Regarding claim 34: Emesh et al teaches a substrate holder 202 (note the type of film on the substrate does not structurally limit the apparatus as the substrate (wafer 212) worked upon is not part of the apparatus, see *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935), a processing head (platen 206) having anodes and cathodes see [0046], a processing liquid supply section

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(tank 208), and a power source 214 that is capable of generating micro-bubbles in the processing liquid.

Regarding claim 35: Emesh et al teaches a power source applying voltage between the anodes and cathodes by applying a pulse voltage, see [0060].

Regarding claim 52: Emesh et al further teaches that at least one of the holder and processing head provides relative movement between the substrate and processing head during application of the voltage between the anodes and cathodes, see [0061].

Regarding claim 53: Emesh et al further teaches a processing liquid supply section to supply an electrolyte 210, see [0042].

4. Claims 34-36, 41-43, 48, 49, 52, and 53 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al (US 2005/0034999).

Lee et al teaches an apparatus for electrically and/or CMP removing conductive material from substrate.

Regarding claim 34: Lee et al teaches a substrate holder 140 (note the type of film on the substrate does not structurally limit the apparatus as the substrate (wafer 110) worked upon is not part of the apparatus, see *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935), a processing head (160, 1082) having anodes and cathodes 120a,b or 1020a,b see [0036, 0092], a processing liquid supply section (vessel 130, supply conduit 1090), and a power source 214 that is capable of generating micro-bubbles in the processing liquid, see also [0092] – [0096].

Regarding claim 35: Lee et al teaches a power source applying voltage between the anodes and cathodes by applying a pulse voltage, see [0084].

Regarding claims 36 and 43: Lee et al further teaches an ultrasonic transducer 1112 in [0096].

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Regarding claim 41: Lee further teaches that the holder and processing head provides relative movement between the substrate, when held by the substrate holder, and the processing head during application of the pulse voltage between the anodes and cathodes, see [0097].

Regarding claims 49 and 52: Lee et al further teaches that at least one of the holder and processing head provides relative movement between the substrate and processing head during application of the voltage between the anodes and cathodes, see [0036].

Regarding claims 42, 48, and 53: Lee et al further teaches a processing liquid supply section to supply an electrolyte 131 [0035].

5. Claims 34, 40, 46, 51, and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Talieh (WO 00/26443).

Regarding claim 34: Talieh teaches a substrate processing apparatus 10 comprising: a substrate holder (wafer head assembly 16) (note the type of film on the substrate does not structurally limit the apparatus as the substrate (wafer) worked upon is not part of the apparatus, see In re Young, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935), a processing head (pad assembly 12 having anodes 30 and cathodes 28, a processing liquid supply section, and a power source, see page 5 lines 13-25.

Regarding claims 40, 46, and 51: The distance between the substrate and the anodes and the distance between the cathodes is different, see Fig. 1B and 2.

Regarding claim 53: The processing solution is an electrolyte see the abstract of Talieh.

5. Claims 34, 39, 47, and 50-53 are rejected under 35 U.S.C. 102(e) as being anticipated by Colgan et al (US 6,495,005).

Colgan et al teaches an electroplating apparatus 302.

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Regarding claims 34 and 50: Colgan et al teaches a substrate processing apparatus comprising a substrate holder (note the type of film on the substrate does not structurally limit the apparatus as the substrate 12 (wafer) worked upon is not part of the apparatus, see *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935)), a processing head with anodes 306 and cathodes 309, a processing liquid supply section (supply lines 350, 354, and 358), and a power source (this is inherently present in order from electricity to be generated though it is unshown or discussed).

Regarding claim 39: Colgan et al teaches supply and suction ports, see Figs. 2, 4, 5, and 13 and col. 6 lines 52-60.

Regarding claim 51: Colgan et al further teaches a distance between the substrate and the cathodes differs from the distance between the substrate and anodes, see Fig. 4.

Regarding claim 52: There is relative movement between the substrate 12 and the processing head see Figs. 2 and 4.

Regarding claim 53: An electrolyte is the processing solution see the abstract.

6. Claims 34, 35, 52, and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Wang (WO 00/03426).

Wang teaches a method and apparatus for electropolishing metal interconnections of semiconductor devices.

Regarding claim 34: Wang et al teaches a substrate processing apparatus (electropolisher 50) comprising a substrate holder chuck 29 (note the type of film on the substrate does not structurally limit the apparatus as the substrate 31 (wafer) worked upon is not part of the apparatus, see *In re Young*, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935)), a processing head

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(polishing receptacle 100 with anodes 4,5,6 and cathodes 1,2,3, a processing liquid supply section (fluid inlet 5,7,9), and a power source 13, 12, and 11.

Regarding claim 35: Pulse power supplies are discussed on page 16 lines 3-10.

Regarding claim 52: Wang further teaches relative movement between the substrate holder and the processing head see page 16 lines 17-27.

Regarding claim 53: An electrolyte 34 is the processing solution.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 37, 38, 44, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al in view of Brown et al (US 6,241,588).

The teachings of Lee et al were discussed above.

Regarding claims 37 and 44: Lee et al fails to teach that ultrasonic transducer is on the processing head.

Brown et al teaches a CMP system comprising a polishing pad and cavitation (ultrasonic) polishing pad conditioner, see the abstract. In the case of the apparatus of Brown et al the processing head is the conditioner wherein the motivation to provide the ultrasonic transducer is to condition the pad, driving out contaminants and re-texturize the pad. In col. 4 lines 45-52 head 30 is connected to the oscillator 32 (ultrasonic transducer). The use of the

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transducer is known to improve cavitation while reducing damage to the wafers, see col.3 lines 39-50 of Brown. Both the prior art of Lee et al and Brown et al recognize the benefits of using an ultrasonic transducer. It would have been obvious at the time of the claimed invention to use the teachings of Brown et al as it shows that it is conventional to integrate the ultrasonic transducer on the processing head rather than having it located separately. Additionally, making elements integral was found to be obvious according to *In re Nerwin v. Erlichman* 168 USPQ 177 and *In re Howard* 150 US 164 (USSC 18930).

Regarding claim 38 and 45: Because the processing head of Lee could become clogged it would have been equally obvious to use both ultrasonic transducers the one of Lee et al (element number 1112 as seen in Fig. 16) and that of Brown to clean the pad of Lee.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.




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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Sylvia R MacArthur  
Primary Examiner  
Art Unit 1763

July 6, 2007